HORTICULTURĂ, VITICULTURĂ, SILVICULTURĂ ŞI PROTECŢIA PLANTELOR

CZU: 634.721:632.654

EFFECT OF NITROGEN CONTENT IN BLACK CURRANT BUDS ON SEVERITY OF GALL MITE INJURY

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Abstract: Articolul prezintă date cu privire la analiza relaţiei dintre conţinutul de proteine şi azot nonprotein în mugurii de coacăză neagră şi gradul de deteriorare a plantelor de bifa. Studiile au fost efectuate pe soiuri de coacăză neagră cu diferite grade de rezistenţă la dăunători [Kipiana (fără afectare), Perun (3 puncte), Little Prince (5 puncte)]. Analizele au fost efectuate în diferite fenofaze de dezvoltare a plantelor (în stare de repaus profund, înainte de începerea vegetaţiei şi după finalizarea ei, în timpul perioadei de repaus fiziologic). Au fost determinate fenofazele, asupra cărora influenţa conţinutului diferitelor forme de azot este cel mai semnificativ.

Cuvinte cheie: Azot proteic, Coacăz negru, Rezistenta la acarieni.

INTRODUCTION

Nitrogen – is a main nutrient for all plants. Nor proteins, nor vitamins, B vitamins in particular, are formed without nitrogen. In the period of maximum shoot and leave growth nitrogen is intensively absorbed and uptaken. Therefore lack of nitrogen negatively results in plant growth: leaves, shoots and fruit are of the smaller size, leaves become light-green and even yellow. Furthermore the increased nitrogen level in plant organs causes more heavy pest and mite injuries of plants. 54 % of investigations confirm the given conclusion (V. Sammersov,1974). Simultaneous studies have been conducted on both the effect of nitrogen on plant injury and determination of nitrogen fertilizer rate.

Application of nitrogen fertilizers stimulates vegetative growth, accumulation of non-protein nitrogen forms (amino acids), intensifies tissue hydration, results in cell volume increase, cell membrane thinning, and cuticular thickness reduction. Disease agents more easily introduce into host plant tissues and promote plant susceptibility to biotic factors. Disbalance of plant nutrition and more severe disease development result from excess of nitrogen nutrition. Plants and harmful organisms are characterized by similar nitrogen requirement. Nitrogen fertilizer application stimulates both yield increase and harmful organism propagation (*http://www.sunnygarden.ru/fert]/fert_m2.html*). The dependence of injury severity on nitrogen fertilizer rate was determined relatively black currant plant and gall mite (G. Tikhonov, 1999). The quantity of nitrogen incorporated into soil and accumulated in plants of one cultivar was under consideration.

MATIRIAL AND METHODS

Black currant cultivars with different level of resistance to gall mite were used in the experiment. Kipiana is a pest immune cv, Perun and Malen'kii prints injuries were up to 3 and 5 points correspondingly. Common methods were used for resistance evaluation (G. Lobanov, 1973).

In accredited experimental laboratory of agrochemical service of agricultural enterprise FGU State center of agrochemical service ''Tambovskii'' (Tambov) nitrogen level in buds was determined.

THE RESULTS AND DISCUTION

We have suggested that the nitrogen level as a factor limiting mite injury depends not only on the rate of fertilizer applied but on cv biological characteristics also.

The content of different nitrogen forms in plant bud in different phenological phases was determined. In the period of exogenous dormancy the cvs Kipiana, Perun, Malen'kii prints contained 1,9%, 2,22% and 2,50% protein nitrogen (air-dry), respectively.

Kipiana. The middle-late ripening cultivar, obtained in VNIISPK from crossing between 762-5-82 selection (BC_4 from nutmeg currant) and cv Exotica. It combines immunity to mildew and gall mite and high resistance to rust, slight leaf spot injury and availability to mechanical harvest.

Bush is middle-vigorous, middle-spread. Fruit is large-sized, average and maximum mass is 1,3 g and 2,1 g respectively, fruit is round, nearly, skin is thin, ripening is rather uniform. Fruit content of sugar, acid and vitamin C is 6,4%, 2,33%, 236,7% correspondingly. Average and maximum yield is 9,5 t/ha and 14,3 t/ha respectively. Fruit is available for fresh fruit consumption and processing. In 2002 cv Kipiana entered in The State Register of cultivars allowed for use in TSFO.

Perun. Middle-ripening cv obtained from crossing between 2-4-56 seedling and cv Brodtorp. The cv was obtained in VNII of lupin. The cv is resistant to drought, frost, middle-resistant to mildew, antracnose, gall mite and slightly damaged by aphid.

Busy is middle-vigorous, semi spread. Raceme is intermediate and long (6-11 fruit). Fruit is large sized (1,3-4,0 g), round, glanced with firm skin and dry scar. Fresh is greeny, sweet, with pronounced aroma, very tasty. Vitamin C, sugar, acid content is 150-209 mg/%, 8,2%, 3,3% correspondingly. Yield is 8,2 t/ha. Fruit is for universal use.

Malen'kii prints. Early-ripening cultivar obtained in VNIIS im. I.V. Michurina from crossing between Ojebyn and Chyornyi Zhemchug. The cv is light resistant, self-fertile and precocious, resistant to fungous diseases, red spider mite and still relative resistant to gall mite, however in resent years severity of pest injury can achieve 5 points.

The bush is middle-vigorous, weak-spread. Fruit is middle and large sized (1,3-3,0 g), black-coloured and glanced. The taste is sweet and sour, the scar is dry. Raceme is middle-sized, internodes are adjacent, multiple race med. The content of sugar, acid and vitamin C in fruit is 10,7%, 2,6% and 139 mg% correspondingly. Yield is 4,0-4,5 kg/busy. Fruit is for universal use.

The level of different nitrogen forms in buds of black currant cultivars with various resistance to gall mite.

Nitrogen level in buds		Cultivar name		
		Kipiana	Perun	Malen'kii prints
In the period of exogenous dormancy (Mach)	Moisture, %	49,13	47,13	47,25
	N_{total}, %	2,19	2,53	2,68
	$N_{non\text{-}protein.}$, %	0,24	0,31	0,18
	$N_{protein.\ air\text{-}drypr..}$, %	1,95	2,22	2,50
	$N_{natural\ protein.}$	-	-	-
Before vegetation (April)	Moisture, %	54,28	57,61	57,90
	N_{total}, %	5,2	5,3	5,9
	$N_{non\text{-}protein.}$, %	1,56	1,59	1,77
	$N_{protein.\ air\text{-}drypr..}$, %	3,64	3,71	4,11
	$N_{natural\ protein.}$	1,68	1,59	1,73
In the period of physiological dormancy (October)	Moisture, %	54,82	56,61	58,46
	N_{total}, %	1,82	2,29	2,39
	$N_{non\text{-}protein.}$, %	0,26	0,31	0,36
	$N_{protein.\ air\text{-}drypr..}$, %	1,56	1,98	2,03
	$N_{natural\ protein.}$	0,70	0,86	0,84

Before vegetation the level of protein air-dry nitrogen form increased up to 3,64, 3,71 and 4,11% respectively, in the period of physiological dormancy it dropped up to 1,56, 1,98, 2,03%. Similar trend was observed relatively total nitrogen variation, during dormancy correlation coefficient between severity of gall mite injury and protein nitrogen level in buds was 0,99.

Similar values in the beginning and after vegetation were 0,96 and 0,86, respectively. Characteristic variations between cultivar were exactly expressed despite of fluctuations due to specific phases of development. Nitrogen level effect on severity of injury was observed relatively non-protein nitrogen

form. Low level of non-protein nitrogen (0,18%) in high susceptible cv Malen'kii prints in the period of dormancy allows preliminary conclusion that protein form in particular is needed for pest activity.

CONCLUTION

The relationship between nitrogen protein form content and severity of gall mite was observed at all stages of dormancy. The most close correlation was observed during dormancy prior to the vegetation initiation. The effect of non-protein nitrogen form content was expressed only before and after vegetation initiation. Therefore high nitrogen level in black currant buds plays a positive role in gall mite activity.

BIBLIOGRAPHY

1. Lobanov, G. Programma i metodika plodovykh, yagodnyh i orekhoplodnykh kul'tur, Michurinsk, 1973, p.191-192.

2. Sammersov, V. O prichinakh vliyania miniral'nykh udobrenii na rastitel'noyadnykh nasekomekh I kleschei // V Sb.: Voprosy entomologii, Minsk, 1974, p.138-147.

3. Tikhonov, G. Povyshenie urozhainosti smorodiny chyornoi na osnove sovershenstvovaniya zaschity ego ot kleschei v severo-vostochnoi chasti Tsentral'nogo Chernozem'ya: Avtoref. dis. kand. s.-kh. nauk. Michurinsk, 1999. p. 25.

4. Udobreniya dlya sada [elektronnyi resurs] / Kak Sozdat' Vash Prekrasnyi Sad. Rezhim dostupa http://www.sunnygarden.ru/fert]/fert_m2.html, data dostupa 20.12.2010.

Data prezentării articolului – ***31.03.2011***